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Longitudinal associations among food insecurity, depressive symptoms, and parenting.

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Abstract

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Abstract

A risk and resilience framework (Patterson, 2002) was used to examine longitudinal relationships among food insecurity, depressive symptoms, parenting confidence, perceived parenting support, and knowledge of community resources. Data from "Rural Families Speak" (a multi-state longitudinal study of rural low-income families) were analyzed using path analysis for 314 rural mothers with low incomes. Results show that food insecurity and depressive symptoms in Wave 1 predicted increased depressive symptoms in Wave 2, and depressive symptoms in Wave 2 were related to decreased perceived parenting support and parenting confidence in Wave 2. Knowledge of community resources in Wave 1 moderated the relationship between depressive symptoms in Wave 1 and perceived parenting support in Wave 2, and the relationship between food insecurity in Wave 1 and parenting confidence in Wave 2. Implications of the impact of food insecurity and depressive symptoms on parenting among rural low-income mothers are discussed.

Keywords: rural, food insecurity, depression, parenting

Longitudinal Associations among Food Insecurity, Depressive Symptoms, and Parenting

Food insecurity happens "whenever the availability of nutritionally adequate and safe food or the ability to acquire acceptable foods in socially acceptable ways is limited or uncertain" (Anderson, 1990, p. 1560). In 2012, 49 million people lived in food insecure households in the United States; of these, 15.9 million were children (Coleman-Jensen, Nord, & Singh, 2014). Food insecurity is more prevalent among households with low incomes and results from insufficient household resources (Coleman-Jensen, Gregory, & Singh, 2014). Depression also is more prevalent among low-income households, in part because of the combined effects of multiple physical and psychosocial hardships that cause chronic stress that overwhelms a person's ability to cope (Evans & Kim, 2013). Given that the majority of consistently poor counties are rural (Economic Research Service, 2015), food insecurity and depression are central issues faced by rural communities. Additional factors related to food insecurity and depression among the poor in rural America are lack of access to grocery stores (Economic Research Service, 2009; Hofferth & Iceland, 1998; Morton, Bitto, Oakland, & Sand, 2005) and lack of access to mental health services (Gustafson, Preston, & Hudson, 2009). Thus, poor families who live in rural America may face greater hardships in raising children compared to their urban counterparts. We sought to further understand longitudinal relationships among food insecurity, depressive symptoms, parenting confidence, parenting support, and knowledge of community resources among rural, low-income families.

Household Food Insecurity, Depression, and Parenting

Among rural mothers, food insecurity is associated with depressive symptoms (Browder, Greder & Jasper Crase, 2013; Huddleston-Casas, Charnigo & Simmons, 2009; Lent, Petrovi, Swanson, & Olson, 2009). Consistently high depressive symptoms among rural Latina mothers

was related to being more food insecure than those whose depressive symptoms were consistently low. Huddleston-Casas and colleagues (2009) examined the relationship between food insecurity and depressive symptoms in rural mothers over time. The relationship was reciprocal, which means there is a concurrent causal relationship between food insecurity and depressive symptoms among rural mothers. Lent and colleagues (2009) found depressive symptoms were associated with remaining food insecure over time, and this relationship was mediated by limiting the ability of family members to work or find childcare.

Although researchers continue to examine depression among rural women with low incomes, few studies have examined the effects of depression on rural mothers' confidence in their ability to carry out their role as a parent. Some previous research suggests that depression can negatively affect a mother's sense of self-efficacy (i.e., her belief that she has the ability to achieve a task) (Bandura & Cervone, 1986), although Sevigny and Loutzenhiser (2009) found depression directly impacted fathers' parenting self-efficacy, but not mothers' parenting self-efficacy. The findings of Sevigny and Loutzenhiser may be due in part to the demographics of the sample, a small sample size resulting in Type II error, or that these were parents of toddlers. Nonetheless, the paucity of research on the effects of depression on parenting confidence points to a need for further research.

Theoretical Framework

In this study, we use a risk and resilience framework based on Patterson (2002) to examine associations among food insecurity, depressive symptoms, knowledge of community resources, and parenting confidence and support among rural mothers with low incomes. The conceptual model in Figure 1 provides further detail. We conceptualize food insecurity and depressive symptoms as risks and parenting confidence and support as family outcomes.

Knowledge of community resources is thought of as a protective mechanism that may moderate, or buffer, the effect of the risks on the family outcomes.

Present Investigation

Although the associations between food insecurity and depression among rural low-income mothers is well documented, little is known about how these risks affect parenting confidence and parenting support or how a mother's knowledge of community resources serves as a protective mechanism. Additionally, our study extended the work of Huddleston-Casas and colleagues (2008) by including parenting variables as outcomes. The longitudinal design of the current study permitted us to test stability over time, allowed initial levels of food insecurity and depressive symptoms to be controlled for, as well as strengthened our ability to examine causality by establishing temporal order. Our main goals were to test the stability and reciprocal relationships between household food insecurity and depressive symptoms over time, to test how these relationships affect parenting confidence and parenting support, and to test the knowledge of community resources as a protective mechanism.

Our first hypothesis, related to testing stability and reciprocal relationships, was that risk predicts risk, that is, food insecurity would predict subsequent food insecurity and depression; and depression would predict subsequent depression and food insecurity. Second, we hypothesized that food insecurity and depressive symptoms were risks negatively associated with the family outcomes of parenting confidence and perceived parenting support. A third hypothesis was that perceived parenting support would be positively associated with parenting confidence. A fourth hypothesis was that knowledge of community resources would serve as a protective mechanism and moderate relationships among all variables in the model.

Methods

Participants

The sample in this study was drawn from the multi-state longitudinal study of rural low-income families, *Rural Families Speak* (RFS; Bauer, 2004; Bauer & Katras, 2007), which contains three Panels and three Waves. Data from Panels 1, 2, and 3 from Waves 1 and 2 were used for this research (N = 314), because Wave 3 did not contain the outcome variables of interest for the present investigation. To participate in the study, mothers had to have a child age 12 or under, be at least 18 years of age, and live in a household at or below 200% of the federal poverty line. Additionally, mothers had to live in counties considered rural, with populations ranging from 2,500 to 19,999.

Data Collection

In-person interviews with mothers were conducted by a member of the RFS research team trained in interviewing techniques using a semi-structured protocol. Mothers were interviewed in locations convenient to them (e.g., their homes). The interviews were audio recorded and transcribed verbatim. Interviews lasted approximately 90-120 minutes and yielded quantitative and qualitative data about participants' household composition, physical and mental health, food security status, housing, household expenses, income, social support, and parenting, as well as attitudes about and experiences with welfare reform.

Measures

Food security, measured in Wave 1 and Wave 2, was assessed by calculating the sum score of responses to 18 questions included in the U.S. Household Food Security Module (Hamilton et al., 1997). Two questions refer to uncertainty about having enough food and the experience of running out of food. The other questions refer to food quality, variety, desirability and disruptions of normal eating patterns and reductions in food intake. Three or more affirmative responses identified a household as food insecure. Cronbach's alpha was 0.81 for the

present study sample.

Depressive symptoms were measured in Wave 1 and Wave 2 using the Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977). The CES-D contains 20 items on a Likert-type scale ranging from 0 = *rarely or none of the time* to 3 = *most or all of the time.* Participants responded to statements such as: I felt lonely, I could not shake the blues, I could not get going, and people were unfriendly. Cronbach's alpha was 0.91 for the present study sample.

Parenting Confidence was measured in Wave 2 by an adapted version of the Oregon Healthy Start Parent Ladder (Pratt, McGuigan, & Katzev, 2000). The sum score of seven questions was used to measure parenting confidence. Participants responded to questions pertaining to parenting confidence on a Likert-type scale that ranged from 0 = *no agreement* to 6 = *high level of agreement*. The seven items about parenting confidence included statements such as, "Your confidence that you know what is right for your child," "Your ability to create a safe home for your child," "Your ability to find fun activities of interest to your child," and "Your knowledge of children's growth and development." Cronbach's alpha was .66 for the present study sample.

Perceived Parenting Support was measured in Wave 2 by an adapted version of the Oregon Healthy Start Parent Ladder (Pratt, et al., 2000). The sum score of six questions was used to measure perceived parenting support. Participants responded to questions pertaining to parenting support on a Likert-type scale that ranged from 0 = *no agreement* to 6 = *high level of agreement*. The six items about parenting support included statements such as "Other parents to talk to," "Someone to offer helpful advice or moral support," and "Professionals to talk to." Cronbach's alpha was .83 for the present study sample.

Knowledge of Community Resources (Richards, Pamulpati, Corson, & Merrill, 2000) is the sum of 22 questions to which participants responded either yes or no in Wave 1. Participants were shown a list of community resources and asked to indicate which ones they knew about. Questions were related to community resources such as help with heating bills, subsidized housing, how to find a mental health counselor, and how to apply for Supplemental Nutrition Assistance Program or Women Infants and Children. The complete list of questions can be found in Table 1. As this measure is an index, a test of internal reliability is not applicable.

Two Wave 1 variables were included as controls. Mother's education level was on an eight point scale ranging from 1 = *8th grade or less* to 8 = *graduate degree*. Total number of children was the number of children reported to be living in the household. These two variables were included as controls to evaluate the unique contribution of the predictors to the mediators and outcome variables, while holding constant the effects of education and number of children, as it is possible that these two demographics variables could be related to household food insecurity and depressive symptoms.

Analysis

Descriptive statistics for demographics and measures were computed in SPSS. To examine relationships among variables, the model (Figure 1) was tested using path analysis in AMOS. To test for stability and reciprocal relationships among the risk variables, paths from food insecurity (Wave 1) and depressive symptoms (Wave 1) to food insecurity (Wave 2) and depressive symptoms (Wave 2) were included to test the first hypothesis. Paths from each risk variable (food insecurity and depressive symptoms) to the family outcome variables (parenting confidence and perceived parenting support) were included to test the second hypothesis. Finally, a path from perceived parenting support (Wave 2) to parenting confidence (Wave 2) was

included to test the third hypothesis.

Before testing the fourth hypothesis, knowledge of community resources as a moderator, *t*-tests were performed in SPSS to determine if there were mean differences between the two groups in scores on the measures in the model. To create two groups, the median sum score of knowledge of community resources (Wave 1) was used, as opposed to the mean, to avoid the influence of high or low scores on the split value. Participants with the median score of 18 and above comprised the group with higher levels of knowledge of community resources, while participants with a score of 17 and below comprised the group with lower levels. Bivariate correlations were run in SPSS for all variables in the model for each group. To test if knowledge of community resources is a protective mechanism (moderator), we tested the model (Figure 1) using two groups. To determine if knowledge of community resources was a moderating variable, critical ratios for difference were computed in AMOS. From the pairwise comparison matrix, z-scores were created and compared with the critical z-score to determine if moderation occurred.

Results

Briefly, the participants were approximately 30 years of age and had two children on average. The majority of mothers were non-Hispanic White (63.1%), married (45.5%) and had a high school education (29.1%). Descriptive statistics related to the measures for food insecurity, depressive symptomology, parenting confidence, perceived parenting support and knowledge of community resources can be found in Table 2. *T*-tests for differences in scores on the measures for the groups with high and low levels of knowledge of community resources indicated the groups, while having different levels of knowledge, were not statistically different when considering mean scores of household food insecurity, depressive symptoms, parenting support,

or parenting confidence. Results for the bivariate correlations between all variables for the high and low knowledge level populations are in Table 3.

The results of the model for the entire sample (N = 314) are shown in Table 4. The χ^2 for the model was 4.914 with *df* = 5 (*p* = .426). The model fit the data very well in terms of CFI = 1.00, and RMSEA = .000. Three main hypotheses were tested for the entire sample. The first hypothesis, that risk predicts risk, was fully supported. Food insecurity at Wave 1 was found to predict depressive symptoms at Wave 2, which indicates the more food insecure a participant was, the more symptoms of depression they experienced. Food insecurity at Wave 1 also was found to predict food insecurity at Wave 2. Depressive symptoms at Wave 1 was found to predict food insecurity at Wave 2, which shows the more symptoms of depression participants experienced in Wave 1, the more food insecure they were in Wave 2. Depressive symptoms at Wave 1 also was found to predict depressive symptoms at Wave 2.

The second hypothesis was partially supported, as depressive symptoms at Wave 2 predicted perceived parenting support at Wave 2, and parenting confidence at Wave 2, which indicates the more symptoms of depression participants experienced, the more their levels of perceived support and confidence were decreased, while controlling for initial levels (Wave 1) of depressive symptoms. The third hypothesis was supported, as perceived levels of parenting support at Wave 2 positively predicted parenting confidence at Wave 2, meaning participants with higher levels of perceived support in the parenting role were more likely to feel confident as a parent.

The results for the moderated model are detailed in Table 5. The χ^2 for the moderated model was 15.462 with *df* = 10 (*p* = .116). The model fit the data very well, CFI = 0.983, RMSEA = .049. However, the fourth hypothesis that knowledge of community resources would

serve as a protective mechanism and moderate all relationships was not supported. Results indicated knowledge of community resources had a moderating effect on only two relationships, depressive symptoms at Wave 1 to perceived parenting support at Wave 2 and food insecurity at Wave 1 to parenting confidence at Wave 2.

Discussion

Rural mothers with low incomes face many risks, yet they are also resilient. The purpose of this study was to utilize a risk and resilience framework based on Patterson (2002) to examine the risks of food insecurity and depressive symptoms on parenting confidence and support, and how knowledge of community resources could act as a protective mechanism.

First, the risks of food insecurity and depressive symptoms were stable over time for the full sample. These relationships show that risks persist; therefore, prevention and intervention efforts such as SNAP and increased access to, and utilization of, mental health resources are important issues for policymakers to consider. Consistent with previous research, the relationship between these risk variables was reciprocal for the full sample. This is important because these risks can be addressed at multiple levels by addressing barriers to food security and mental health in rural communities.

Food insecurity was found to predict depressive symptoms over time and in turn, depressive symptoms were found to predict both parenting confidence and support in the parenting role in the overall sample. These relationships show that initial levels of food insecurity may cause increased depressive symptoms, which in turn may cause a decrease in both parenting confidence and parenting support for rural low-income mothers.

In both the overall sample and the sample with high levels of knowledge of community resources, risk predicted risk, that is, initial depressive symptoms predicted subsequent food

insecurity and initial food insecurity predicted subsequent depressive symptoms. Additionally, in both the overall sample and the sample with high levels of knowledge of community resources, depressive symptoms in Wave 2 was related to parenting support. In both the overall sample and the sample with low levels of knowledge of community resources, depressive symptoms in Wave 2 was related to parenting confidence. Finally, for the sample with low levels of knowledge of community resources, depressive symptoms in Wave 1 predicted parenting support in Wave 2.

Knowledge of community resources served as a protective mechanism in two ways. Those with high levels of knowledge of community services were protected from risk of depression negatively affecting perceived parenting support and the risk of food insecurity negatively affecting parenting confidence. The group with low levels of knowledge of community resources was not protected -- the relationship between depressive symptoms and perceived parenting support was significant.

Limitations

In this study, the sample was purposively selected and therefore non-representative, which limits generalizability to the study population because of self-selection bias. Another limitation is that the measures only reflect perceptions of the mother, leaving out perspectives of other household members or observational data. In addition, each construct was measured by only one scale, reducing convergent validity. Finally, we were unable to control for initial levels of parenting confidence and perceived parenting support, which could impact depressive symptoms. Future studies should consider the use of a representative sample, the collection of data from multiple household members using multiple measures to assess key constructs, the collection observational data, and important control variables.

Conclusions

It is clear that food insecurity and depressive symptoms are detrimental to parenting confidence and perceived parenting support. Numerous implications can be drawn from the results. The risk variables of food insecurity and depression were stable over time and reciprocal. Taken together, these relationships highlight the need for professionals to work across agencies to better serve rural mothers and their families. Mental health professionals and professionals involved with food programs such as Supplemental Nutrition Assistance Program, Women Infants and Children, and Family Nutrition and Education Programs can work together to assess family risk. Both depression and food insecurity can be measured accurately in a short span of time, allowing professionals to assess both types of risk and make appropriate referrals. Depressive symptoms significantly predicted perceived parenting support and parenting confidence in the full sample. Again, these relationships point to the need for professionals to work across agencies to fully support rural mothers and their children. For example, mental health professionals and early childhood education professionals could work together to mitigate the effects of depressive symptoms on parenting confidence and support.

Broadly, rural families need increased access to food resources such as grocery stores and food pantries, as well as increased access to mental health resources. Both mobile health clinics and mobile food pantries are possible ways to increase access to these resources for rural families. Additionally, telehealth is an effective way to deliver mental health services and medical care for rural residents (Brownlee, Graham, Doucette, Hotson, & Halverson, 2010; Finkelstein, 2011; Swinton, Robinson, & Bischoff, 2009). Living in a more rural area and using social media are related to increased acceptance of telehealth mental health services (Reed, Messler, Coombs, & Quevillon, 2014). A multi-pronged approach utilizing the above strategies and tailored to the rural community could be most beneficial.

The role of knowledge of community resources as a protective mechanism points to a need for effective dissemination of information about available resources to rural mothers. A lack of knowledge about resources available in the community leaves rural mothers more susceptible to depressive symptoms, which impacts perceived support in parenting. Just as telehealth has reduced barriers to healthcare for rural residents, technology has the potential to increase levels of resource awareness. Increases in reliable access to the Internet, along with the use of Smartphones and tablets could serve as means to disseminate information about local resources to rural mothers. Future research should consider if knowing about a resource without using the resource is enough to buffer the effects of risks on family outcomes. Knowledge without utilization of a social safety net such as SNAP may reduce depressive symptoms and improve perceived support in parenting. Additionally, future research should continue to examine both how rural mothers' knowledge of community resources can serve as a protective mechanism and how technology can best be used to increase knowledge of community resources.

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Table 1

List of Resources From Knowledge of Community Resources Index

Resources	
Get help on heating bills	Apply for welfare
Apply for subsidized housing	Get legal assistance
Find temporary housing	Apply for food stamps
Apply for Medicaid	Apply for WIC
Find help for a drug or alcohol problem	Locate job training
Find help for a domestic violence problem	Find transportation choices
Get your child immunized	Find child care
Find a family doctor	Apply for a child care subsidy
Find a family dentist	Find help for a family member with disabilities
Find a mental health counselor	Find low-cost clothing for your family
Find family planning services	Find Cooperative Extension Activities

Table 2

Means, Standard Deviations, and Range of Possible Scores for Study Measures

Variable	*M*	*SD*	*Range*
Food insecurity W1	3.6	3.86	0 – 18
Food insecurity W2	3.01	3.53	0 – 18
Depression W1	17.35	11.47	0 – 60
Depression W2	14.42	11.09	0 – 60
Parental support	27.66	6.64	0 – 36
Parental confidence	30.97	4.95	0 – 36
Knowledge of community resources	16.59	4.95	0 – 22

Table 3

Correlations Among Study Variables for Groups High in Knowledge of Community Resources (above diagonal) and Low in Knowledge of Community Resources (below diagonal)

Variables	1	2	3	4	5	6	7	8	9
1.Number of children	1	-.159	.218*	.175	-.051	.048	-.279**	-.117	.128
2. Mothers' educational level	-.011	1	-.127	-.013	-.100	-.147	.156	.200*	.028
3. Food Insecurity W1	-.049	-.174	1	.545**	.292**	.417**	-.258**	-.263**	.222*
4.Food Insecurity W2	-.023	-.155	.608**	1	.325**	.382**	-.214*	-.241*	.136
5. CES-D W1	-.103	-.045	.402**	.249*	1	.616**	-.265**	-.342**	.058
6. CES-D W2	-.098	-.035	.388**	.198*	.625**	1	-.420**	-.428**	.052
7. Parenting Support W2	-.079	-.022	-.229*	-.131	-.397**	-.375**	1	.473**	.010
8. Parenting confidence W2	-.016	-.003	-.085	-.098	-.278**	-.469**	.500**	1	.074
9. Knowledge of community resources W1	-.069	.140	-.043	-.099	-.041	-.009	-.094	-.184	1

* $p < 0.05$ (2-tailed). ** $p < 0.01$ (2-tailed). *Note.* W1 = Wave 1, W2 = Wave 2.

Table 4

Model Results for the Full Sample

Paths	B	*SE*	β	*P*
# children to FI W2	-.013	.136	-.005	.925
# children to Depression W2	-.526	.431	-.060	.223
Education level to FI W2	-.020	.121	-.008	.867
Education level to Depression W2	-.030	.381	-.004	.937
FI W1 to FI W2	.478	.048	.523	***
FI W1 to Depression W2	.636	.153	.221	***
Depression W1 to FI W2	.036	.016	.116	.027*
Depression W1 to Depression W2	.434	.050	.452	***
FI W1 to parent support	-.145	.119	-.084	.224
FI W1 to parenting confidence	.145	.084	.133	.083
Depression W1 to parent support	-.074	.038	-.128	.053
Depression W1 to parenting confidence	-.015	.027	-.035	.577
FI W2 to parent support	.058	.125	.031	.643
FI W2 to parenting confidence	-.148	.087	-.105	.091
Depression W2 to parent support	-.172	.039	-.287	***
Depression W2 to parenting confidence	-.134	.029	-.300	***
Parent support to parenting confidence	.228	.041	.306	***

*$p < 0.05$. *** $p < 0.001$. *Note*. FI = Food insecurity, W1 = Wave 1, W2 = Wave 2.

Table 5

Standardized Estimates of the Final Model, Moderated by Knowledge of Community Resources

Paths	Low Group		High Group	
	β	*P*	β	*P*
# children to FI W2	.004	.954	.093	.259
# children to depression W2	.000	.997	.023	.759
education level to FI W2	-.055	.480	.059	.463
education level to depression W2	.014	.857	-.053	.459
FI W1 to FI W2	.599	***	.465	***
FI W1 to depression W2	.142	.106	.221	.005**
Depression W1 to FI W2	.006	.948	.191	.024*
Depression W1 to Depression W2	.561	***	.546	***
FI W1 to parent support	-.010	.993	-.104	.339
FI W1 to parenting confidence	.200	.063	-.054	.591
Depression W1 to parent support	-.301	.011*	.000	.999
Depression W1 to parenting confidence	.067	.541	-.127	.220
FI W2 to parent support	-.008	.940	-.001	.990
FI W2 to parenting confidence	-.111	.262	-.030	.760
Depression W2 to parent support	-.179	.122	-.375	***
Depression W2 to parenting confidence	-.407	***	-.166	.135
Parent support to parenting confidence	.403	***	.349	***

*$p < 0.05$. *** $p < 0.001$.

Note. FI = Food insecurity, W1 = Wave 1, W2 = Wave 2.

Figure 1
Conceptual Model

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Figure 2
Comparison of results for full sample and high and low groups

The figure has been uploaded as a separate file.